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PTO/SB/08A (10-96)  
App. for use through 10/31/99. OMB 0851-0031  
Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

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Substitute for form 1449A/PTO

## INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Sheet 1 of 4

Complete if Known

Application Number 09/481,803  
Filing Date 08/31/1998  
First Named Inventor TAVKHELIDZE, Avto  
Group Art Unit 2834  
Examiner Name TAMAI, K  
Attorney Docket Number

### U.S. PATENT DOCUMENTS

Examiner Initials <sup>1</sup>	Cite No. <sup>1</sup>	U.S. Patent Document		Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number	Kind Code <sup>2</sup> (if known)			
Karl Imayoshi Dizo Tamai		6,089,311		Edelson. J.S.	07-18-00	
		2,510,397		Hansell. C.W.	06-06-50	
		2,915,652		Hatsopoulos. G.N.	12-01-59	
		3,021,472		Hernqvist. K.G.	02-13-62	
		3,118,107		Gabor. D.	01-14-64	
		3,169,200		Huffman. F.N.	02-09-65	
		3,173,032		Maynard. J.T.	03-09-65	
		3,238,395		Sense. K.A.	03-01-66	
		3,239,745		Hernqvist. K.G.	03-08-66	
		3,267,307		Fox. R.	08-16-66	
		3,267,308		Hernqvist. K.G.	08-16-66	
		3,281,372		Haas. G.A.	10-25-66	
		3,300,660		Bensimon. J.	01-24-67	
		3,328,611		Davis. E.D.	06-27-67	
		3,376,437		Meyerand, Jr. R.G.	04-02-68	
		3,393,330		Vary. A.	07-16-68	
		3,470,393		Moncorge. G.	09-30-69	
		3,515,908		Caldwell. F.	06-02-70	
		3,519,854		Davis. E.D.	07-07-70	
		3,578,992		Shimada. K.	05-18-71	

### FOREIGN PATENT DOCUMENTS

Examiner Initials <sup>1</sup>	Cite No. <sup>1</sup>	Foreign Patent Document			Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T <sup>6</sup>
		Office <sup>3</sup>	Number <sup>4</sup>	Kind Code <sup>5</sup> (if known)				
Karl Imayoshi Dizo Tamai			JP404080964A		Ando, Y.	03-13-92		

Examiner  
Signature

*Karl Imayoshi Dizo Tamai*

Date  
Considered

6/24/02

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Group Art Unit	2834
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DEC 21 2001 Sheet 2 of 4

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		Number	Kind Code <sup>2</sup> (if known)			
[Handwritten Signature]		4,004,210		Yater. J.C.	01-18-77	
		4,039,352		Marinescu. M.	08-02-77	
		4,410,951		Nakamura. T.	10-18-83	
		4,423,347		Kleinschmidt. P.	12-27-83	
		4,958,201		Mimura. T.	09-18-90	
		5,028,835		Fitzpatrick. G.O.	07-02-91	
		5,049,775		Smits. J.	09-17-91	
		5,119,151		Onda. K.	01-02-92	
		5,229,320		Ugajin. R.	07-20-93	
		5,233,205		Usagawa. T.	08-03-93	
		5,247,223		Mori. Y.	09-21-93	
		5,332,952		Ugajin. R.	07-26-94	
		5,351,412		Furuhata. T.	10-04-94	
		5,356,484		Yater. J.C.	10-18-94	
		5,371,388		Oda. H.	12-06-94	
		5,521,735		Shimizu. A.	05-28-96	
		5,675,972		Edelson. J.S.	10-14-97	
		5,699,668		Cox. I.W.	12-23-97	
		5,722,242		Edelson. J.S.	03-03-98	
		5,810,980		Edelson. J.S.	09-22-98	

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Sheet	3	of	4
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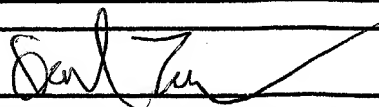
Application Number	09/481,803
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Attorney Docket Number	

Sheet 4 of 4

## OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS

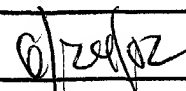
Examiner Initials <sup>1</sup>	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>2</sup>
aw	1	FITZPATRICK. G.O. et al. "Close-Spaced Thermionic Converters with Active Spacing Control and Heat Pipe Isothermal Emitters." IEEE.Vol 2: 920-927 (1996)	
aw	2	FITZPATRICK. G.O. et al. "Demonstration of Close-Spaced Thermionic Converters." Abs. Papers. Am. Chem. Soc. 93355: 1.573-1.580 (1993)	
aw	3	MAHAN. G.D. "Thermionic Refrigeration." J. Appl. Phys 76: 4362-4368 (1994)	
aw	4	HUFFMAN. F.N. et al. "Preliminary Investigation of a Thermotunnel Converter." I.E.C.E.C. vol 1: 573-579 (1988)	
aw	5	HOUSTON. J.M. "Theoretical Efficiency of the Thermionic Energy Converter." J.Appl. Phys. 30: 481-487 (1959)	
aw	6	KING. D.B. et al. "Results from the Microminiature Thermionic Converter Demonstration Testing Program." Am. Inst. of Phys. 1-56396-846: 1432-1436 (1999)	
aw	7	ZENG. T and CHEN. G. "Hot Electron Effects on Thermionic Emission Cooling in Heterostructures." Mat. Res. Soc. 545: 467-472 (1999)	
aw	8	SHAKOURI. A. et al. "Enhanced Thermionic Emission Cooling in High Barrier Superlattice Heterostructures." Mat. Res. Soc. 545: 449-458 (1999)	
aw	9	FUKUDA. R. et al. "Development of the Oxygenated Thermionic Energy Converters Utilizing the Sputtered Metal Oxides as a Collector." Am. Inst. Phys. 1444-1451 (1999)	
aw	10	SVENSSON. R. and HOLMLID. L. "TEC as Electric Generator in an Automobile Catalytic Converter." IEEE. Vol 2: 941-944 (1996)	

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